**Universitatea Naţională de Ştiinţă şi Tehnologie Politehnica Bucureşti**
**Facultatea de Electronică, Telecomunicaţii şi**
**Tehnologia Informaţiei**

# COURSE DESCRIPTION

## 1. Program identification information

| | |
|---|---|
| 1.1 Higher education institution | **National University of Science and Technology Politehnica Bucharest** |
| 1.2 Faculty | **Electronics, Telecommunications and Information Technology** |
| 1.3 Department | **Applied Electronics and Information Engineering** |
| 1.4 Domain of studies | Electronic Engineering, Telecommunications and Information Technology |
| 1.5 Cycle of studies | Bachelor/Undergraduate |
| 1.6 Programme of studies | Applied Electronics |

## 2. Date despre disciplină

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.1 Course name (ro)<br>(en) | | | | Baze de date | | | |
| 2.2 Course Lecturer | | | | S.l./Lect. Dr. Valentin PUPEZESCU | | | |
| 2.3 Instructor for practical activities | | | | S.l./Lect. Dr. Valentin PUPEZESCU | | | |
| 2.4 Year of studies | 2 | 2.5 Semester | 2 | 2.6. Evaluation type | V | 2.7 Course regime | Ob |
| 2.8 Course type | | D | 2.9 Course code | 04.D.04.O.020 | | 2.10 Tipul de notare | Nota |

## 3. Total estimated time (hours per semester for academic activities)

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|---|---|---|---|---|---|
| 3.1 Number of hours per week | 3 | Out of which: 3.2 course | 2 | 3.3 seminary/laboratory | 1 |
| 3.4 Total hours in the curricula | 42 | Out of which: 3.5 course | 28 | 3.6 seminary/laboratory | 14 |
| Distribution of time: | | | | | hours |
| Study according to the manual, course support, bibliography and hand notes<br>Supplemental documentation (library, electronic access resources, in the field, etc)<br>Preparation for practical activities, homework, essays, portfolios, etc. | | | | | 29 |
| Tutoring | | | | | 0 |
| Examinations | | | | | 4 |
| Other activities (if any): | | | | | 0 |

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|---|---|
| 3.7 Total hours of individual study | 33.00 |
| 3.8 Total hours per semester | 75 |
| 3.9 Number of ECTS credit points | 3 |

## 4. Prerequisites (if applicable) (where applicable)

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|---|---|
| 4.1 Curriculum | Computer programming and programming languages 1;<br>Computer programming and programming languages 2;<br>Data structures and algorithms. |
| 4.2 Results of learning | Procedural programming, object-oriented programming |

## 5. Necessary conditions for the optimal development of teaching activities (where applicable)

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| 5.1 Course | Room with a video projector |
| 5.2 Seminary/ Laboratory/Project | Room with computers and internet connection |

**6. General objective** *(Reffering to the teachers' intentions for students and to what the students will be thought during the course. It offers an idea on the position of course in the scientific domain, as well as the role it has for the study programme. The course topics, the justification of including the course in the currcula of the study programme, etc. will be described in a general manner)*

The Databases course is studied in the Applied Electronics and Technologies and Systems for Telecommunications specializations. The course aims to familiarize students with the priciples of relational database design, data definition and data manipulation and the integration of databases in complex applications

**7. Competences** *(Proven capacity to use knowledge, aptitudes and personal, social and/or methodological abilities in work or study situations and for personal and proffesional growth. They refflect the empolyers requirements.)*

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|---|---|
| **Specific Competences** | C4. The design and use of low-complexity software applications specific to applied electronics.<br>C4.2. Explanation and interpretation of specific requirements for structures and software in the fields: computer programming, high-level and specific languages, architecture of computing systems.<br>C4.3. Identification and optimization of software solutions for problems related to: industrial electronics, medical, automotive electronics, automation, robotics, consumer goods production.<br>C6. Solving technological problems in the fields of applied electronics |
| **Transversal (General) Competences** | CT1 Methodical analysis of the problems encountered in the activity, identifying the elements for which there are established solutions, thus ensuring the fulfillment of professional tasks<br>CT2 Defining the activities by stages and assigning them to subordinates with a complete explanation of duties, depending on the hierarchical levels, ensuring the efficient exchange of information and interpersonal communication<br>CT3 Adaptation to new technologies, professional and personal development, through continuous training using printed documentation sources, specialized software and electronic resources in Romanian and, at least, in an international language. |

**8. Learning outcomes** *(Synthetic descriptions for what a student will be capable of doing or showing at the completion of a course. The learning outcomes reflect the student's acomplishments and to a lesser extent the teachers' intentions. The learning outcomes inform the students of what is expected from them with respect to performance and to obtain the desired grades and ECTS points. They are defined in concise terms, using verbs similar to the examples below and indicate what will be required for evaluation. The learning outcomes will be formulated so that the correlation with the competences defined in section 7 is highlighted.)*

| | |
|---|---|
| **Knowledge** | *The result of knowledge aquisition through learning. The knowledge represents the totality of facts, priciples, theories and practices for a given work or study field. They can be theoretical and/or factual.*<br>Understanding the specific concepts of relational databases;<br>Correct use of data definition and manipulation instructions;<br>Understanding and applying the principles of database normalization and denormalization;<br>Defining and using procedures, views and triggers;<br>Understanding transactions and identifying situations where they are needed;<br>Overall design of a database of medium complexity, starting from a set of requirements |
| **Skills** | *The capacity to apply the knowledge and use the know-how for completing tasks and solving problems. The skills are described as being cognitive (requiring the use of logical, intuitive and creative thinking) or practical (implying manual dexterity and the use of methods, materials, tools and intrumentation).*<br>Modeling real-world data in a database management system;<br>Handling data stored in a relational database;<br>Identifying and implementing associations between modeled entities;<br>Database and transaction performance analysis;<br>The ability to perform queries of low and medium complexity, starting from a clear requirement;<br>Productive teamwork |
| **Responsability and autonomy** | *The student's capacity to autonomously and responsably apply their knowledge and skills.*<br>Select appropriate bibliographic sources and analyze them.<br>Respect the principles of academic ethics, correctly citing the bibliographic sources used.<br>Demonstrates responsiveness to new learning contexts.<br>Demonstrates autonomy in organizing the learning situation/context or the problem situation to be solved.<br>Analyzes and capitalizes on business/entrepreneurial development opportunities in the specialty area. |

**9. Teaching techniques** *(Student centric techniques will be considered. The means for students to participate in defining their own study path, the identification of eventual fallbacks and the remedial measures that will be adopted in those cases will be described.)*

Starting from the analysis of students' learning characteristics and their specific needs, the teaching process will explore both expository (lecture, exposition) and conversational-interactive teaching methods, but also action-based methods, such as exercise, practical activities and problem solving.
In the teaching activity, lectures will be used, based on some Power Point presentations, as well as the step-by-step implementation of subject-specific examples. Presentations use images and diagrams so that the information presented is easy to understand and assimilate. This discipline covers information and practical activities designed to support students in their learning efforts and the development of optimal collaborative and communicative relationships in a climate conducive to discovery learning.

**10. Contents**

| **COURSE** | | |
|---|---|---|
| **Chapter** | **Content** | **No. hours** |
| 1 | Introduction to databases | 2 |
| 2 | Relational databases | 8 |
| 3 | Database queries | 4 |
| 4 | Views, procedures and triggers | 6 |

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|---|---|---|
| 5 | Database normalization | 2 |
| 6 | Transaction management | 4 |
| 7 | Non-relational databases | 2 |
| | **Total:** | 28 |
| **Bibliography:** | | |

| **LABORATORY** | | |
|---|---|---|
| **Crt. no.** | **Content** | **No. hours** |
| 1 | Introduction to database management systems | 2 |
| 2 | Relational databases | 2 |
| 3 | Relational algebra operations and database queries | 2 |
| 4 | Web application developed with Jakarta Server Pages Technology | 2 |
| 5 | Databases transaction management | 2 |
| 6 | Database normalization | 2 |
| 7 | Laboratory test | 2 |
| | **Total:** | 14 |
| **Bibliography:** | | |

**11. Evaluation**

| Activity type | 11.1 Evaluation criteria | 11.2 Evaluation methods | 11.3 Percentage of final grade |
|---|---|---|---|
| 11.4 Course | - the ability to define the structure of a database starting from an entity-relationship diagram<br>- explaining the created structure and its use, using concepts and instructions specific to relational databases;<br>- defining and explaining specific theoretical concepts | Course test, covering the first 3 chapters of the course material | 40% |
| | - the ability to define and explain views, procedures and triggers<br>- understanding the specific concepts of transactions<br>- defining and explaining the rules of normalization and denormalization of databases | Final course test, covering chapters 4-6 of the course material | 20% |

| | | | |
|---|---|---|---|
| 11.5<br>Seminary/laboratory/project | - the ability to define, modify or optimize a database structure, starting from a clear set of requirements<br>- the ability to manipulate data through queries, views, procedures and triggers<br>- applying the concepts of normalization and denormalization of databases<br>- defining and using transactions, configuring their parameters | Practical laboratory test | 40% |
| 11.6 Passing conditions | | | |
| Obtaining a minimum of 50% of the total points. Obtaining a minimum of 50% of the laboratory points, according to the university and faculty regulations for bachelor studies. | | | |

**12. Corroborate the content of the course with the expectations of representatives of employers and representative professional associations in the field of the program, as well as with the current state of knowledge in the scientific field approached and practices in higher education institutions in the European Higher Education Area (EHEA)**

Databases are used in all fields of activity and are the basis of most online, banking, tourism, health, industrial, etc. applications. The job market is constantly looking for database design engineers, database administrators or programmers. The Database discipline provides the necessary skills to integrate graduates into the labor market, and the curriculum is continuously updated based on feedback received from former graduates and companies. The course presents general concepts, but also particular situations, with practical examples for each concept presented and offers the opportunity to deepen studies in a wide range of fields specific to applied electronics.

| Date | Course lecturer | Instructor(s) for practical activities |
|---|---|---|
| 21.09.2026 | S.l./Lect. Dr. Valentin PUPEZESCU | S.l./Lect. Dr. Valentin PUPEZESCU |

| Date of department approval | Head of department |
|---|---|
| 22.09.2026 | Conf. Dr. Bogdan Cristian Florea |

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|---|---|
| Date of approval in the Faculty Council | Dean |
| 22.09.2026 | Prof. Dr. Mihnea Udrea |

